

2012 Annual Report

Higher Education Energy Alliance

October 2012



Table of Contents

Higher Education Energy Alliance	4
Education and Outreach.....	6
2012 Highlights.....	6
What to Expect in 2013	8
Technology Solutions	9
Lighting and Electrical.....	11
Space Conditioning.....	14
Plug and Process Loads.....	16
Refrigeration	18
Laboratories	20
Market Solutions.....	22
The Alliance in 2013.....	25
Conclusion	26

CBEA by the NUMBERS

10 specifications to help members take advantage of high-efficiency lighting, refrigeration, heating, ventilation and cooling technologies—twice as many as last year...p. 10

\$1 billion energy savings if all 10- to 20-ton commercial RTUs are replaced with units built to the RTU Challenge specification...p. 10

5 MANUFACTURERS participating in the RTU Challenge to meet the specifications for energy savings and performance: Daikin McQuay, Carrier, Lennox, 7AC Technologies, and Rheem...p. 14

ONE MANUFACTURER Daikin McQuay designed a model meeting the RTU Challenge specifications: the Rebel...p. 14

217 CBEA member companies and institutions

66 TWh energy saved if everyone switched to technologies that meet the Alliance's five newest specifications...p. 10

\$16,000–\$52,000 potential annual savings for a single supermarket retrofitting advanced control measures for its RTUs...p. 15

40% achievable savings on energy bills for parking structures utilizing the specifications developed by the Lighting and Electrical Project Team...p. 12

58% actual energy savings reported by Alliance member Walmart, using LED parking lot lighting meeting Alliance specification requirements, in comparison with conventional lighting meeting ASHRAE Standard 90-1-2010 (for LZ3)

19.2% reduction in energy intensity achieved by Alliance member GSA

444 individual Alliance participants

2 CASE STUDIES showcasing best practices in energy-aligned or “green” leasing...p. 22

\$245,000 yearly savings from retrofitting light fixtures with new lighting technology at Alliance member Gundersen Lutheran Health System...p. 13

87 TWh amount of energy lighting troffers use annually, which can be reduced up to 75 percent with the latest technology...p. 10

15 MINUTES shortest payback time frame noted in fume-hood sash management case study conducted by Alliance member University of California at Santa Barbara...p. 21

9 billion square feet owned or managed by Alliance members

20 WEBINARS presented for Alliance members, including Controlling Capital Costs in High-Performance Office Buildings, Tools and Practices for Implementing Green Leasing, Alliance High Efficiency Troffer Specification v3.0, Overview of the Lighting Energy Efficiency in Parking (LEEP) Campaign...p. 7





Higher Education Energy Alliance

Colleges, Universities, and Post-Secondary Institutions



CBEA began welcoming higher education members in mid-2011, forming the Higher Education Energy Alliance (HEEA). Higher education spends an estimated \$14 billion annually on energy costs. Colleges, universities, and other post-secondary institutions across the U.S. hold unique

places in their communities—as civic, academic, and cultural stewards, and opinion shapers. Students, staff, alumni, elected officials, and the general public expect higher education institutions to exhibit wise leadership coupled with strong fiscal oversight—a challenge in the best economic times. HEEA members recognize that vetted energy-saving building components and technologies present campuses’ diverse building portfolios with the opportunity not only to reduce current building operating costs and mitigate future cost volatility, but also to demonstrate strong environmental stewardship.

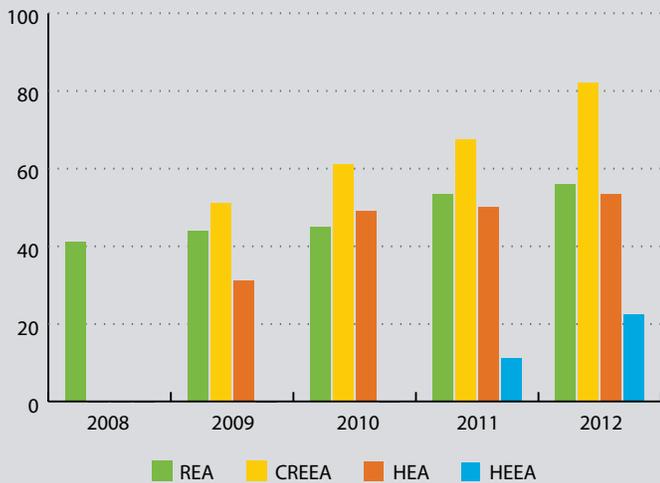
HEEA by the NUMBERS

21 MEMBERS

3 BETTER BUILDINGS CHALLENGE PARTNERS



CBEA Membership Growth



Members

Owners/Operators:

Arizona State University*
 Clark Atlanta University
 Cornell University*
 Duke University*
 Grand Valley State University
 Loyola University
 Massachusetts Institute of Technology

Portland State University*
 Stanford University*
 Tulane University*
 University of California, Berkeley
 University of California, Davis
 University of California, Irvine
 University of California, Merced
University of California System*

University of Hawaii at Manoa

University of Maryland*
 University of South Carolina

University of Utah

University of Wisconsin*

Other Participants:

Energy Efficiency Building Hub
 (EEB Hub)

* Bold type identifies Better Building Challenge participants
 Asterisk (*) indicates CBEA Steering Committee representative



University of California at Irvine

The University of California at Irvine (UC Irvine) tackled laboratory inefficiency challenges by developing “Smart Lab” design criteria for both new construction and facility retrofits. Smart Labs optimize energy efficiency without sacrificing occupant safety, especially in regard to air-changes per hour (ACH). UC Irvine tested the concept in a pilot of integrated design criteria and performance standards, incorporating real-time air quality sensing; reduced fan, filtration, and duct airspeeds; 50-70 percent less exhaust fan energy; reduced internal heat load; and reduced thermal inputs during setback periods. By integrating all these

features in a holistic design, UC Irvine demonstrated an impressive 50 percent reduction in energy use during the pilot. Now, it is sharing these results with other CBEA members through the Laboratories Project Team. In October 2012, UC Irvine offered a workshop at the Labs21 conference to share its findings. This Smart Labs showcase presentation provides outreach as part of UC Irvine’s commitment to CBEA and the Better Buildings Challenge.





Members of the Commercial Building Energy Alliance are high-level executives and professionals who recognize the value of sharing ideas, best practices, and problem-solving strategies with peers who face similar energy challenges. These members spearheaded a number of initiatives in 2012 to enable their peers to benefit from the success of the Alliances. The Alliance expanded its education, outreach, and information programs in 2012, offering members valuable information, networking, and training opportunities.

2012 HIGHLIGHTS

Hosted Successful CBEA Efficiency Forum

On May 23 and 24, DOE hosted the first-ever CBEA Efficiency Forum at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. At the May 23 All-Member Meeting, Alliance members challenged participants to identify shared information



on pathways for maximizing the impact of Alliance resources, share energy savings in their facilities attributable to these resources, and provide feedback on 2013 plans. The May 24 gathering built upon the findings of the All-Member Meeting through an Executive Exchange with Commercial Building Stakeholders, where Alliance members sat down with senior commercial building stakeholders whose expertise, products,



and services directly related to key Alliance areas of interest. To facilitate informed discussion, DOE sent registrants brief overviews of all Alliance activities in advance of the Forum. These overviews described the main barriers addressed by each



activity, as well as deliverables, deployment pathways, and metrics for gauging impact. Overall, a total of 141 individuals engaged in the CBEA Efficiency Forum, including 58 CBEA members, 54 industry stakeholders, and 29 technical experts from DOE and its national labs. Following the Forum, key takeaways were published in the [CBEA Efficiency Forum Report](#), which is available along with presentations on the [CBEA website](#).

Expanded Webinar Series

CBEA webinars provide training and information on a variety of commercial building energy-efficiency topics. Webinars are free and feature experts from industry as well as from DOE's national laboratories. In the past year, the Alliance increased the number of webinars by 50 percent, hosting 20 webinars for Alliance members and interested stakeholders. For details and links to webinars where available, see the "Webinar Presentations" sidebar below.

Revitalized Website to Enhance Accessibility and Access to Resources

A newly restructured, more dynamic, accessible, and user-friendly website was unveiled in late September to engage members and visitors with stronger graphic elements, clearer language, and enhanced navigability. The new [website](#) and some links to specific resources can be found at:

- Alliance home page—Commercialbuildings.energy.gov/alliance
- Database of energy information, resources, and publications—Commercialbuildings.energy.gov/resources
- Alliance specifications—Commercialbuildings.energy.gov/technologies
- Webinars and educational opportunities—Commercialbuildings.energy.gov/webinars

Released Important Resources for Retrofit and New Construction

DOE and partners ASHRAE, the American Institute of Architects (AIA), the Illuminating Engineering Society of North America (IES), and the U.S. Green Building Council (USGBC) have released free guides to help building stakeholders achieve 50 percent energy savings in the building types listed below. All these guides are available for free download at ASHRAE.org/AEDG:

- 50% Medium to Big Box Retail Buildings
- 50% Small To Medium Office Buildings
- 50% K-12 School Buildings
- 50% Large Hospitals

In addition, DOE, PECO and partners released the following guides to help building owners and managers maximize building energy performance during building retrofits and renovations:

- [Advanced Energy Retrofit Guide for Office Buildings](#)
- [Advanced Energy Retrofit Guide for Retail Buildings](#)
- [Advanced Energy Retrofit Guide for Grocery Stores](#)

The retrofit guides can be downloaded for free at Commercialbuildings.energy.gov/resources.

Offered Re-tuning Training

CBEA offered the first of several planned building re-tuning trainings on October 2-4 in Washington D.C. The training gave CBEA-member facilities management staffers a chance to improve their knowledge of low-cost, low-hassle measures to reduce energy consumption in commercial buildings. See page 24 for additional details.



Commercial Building Energy Alliance Webinar Presentations

Commercialbuildings.energy.gov/webinars

- [The High Performance Windows Volume Purchase Program](#)—October 12, 2011
- [High Efficiency Troffer Specification](#)—October 25, 2011
- [Controlling Capital Costs in High-Performance Office Buildings](#)—October 31, 2011
- [Direct-DC Power Systems for Efficiency and Renewable Energy Integration](#)—November 3, 2011
- [Restaurant Energy Performance Evaluation: How-To Guide and Spreadsheet](#)—November 16, 2011
- [Assessing and Reducing Plug and Process Loads in Commercial Office and Retail Buildings](#)—November 21, 2011
- [Implementation of the ENERGY STAR® Commercial Kitchen Package](#)—November 30, 2011
- [Designing and Modeling HVAC Systems with SystemOutliner](#)—December 7, 2011
- [The L Prize-Winning LED A19 Replacement—What Commercial Building Owners/Operators Can Expect in 2012](#)—January 18, 2012
- [CBEA High Efficiency Troffer Lighting Specification](#)—February 16, 2012
- [Updating Chicago Properties without Capital Expenditure or Debt](#)—March 8, 2012
- [DOE Commercial Building Energy Asset Rating Pilot Project Information Webinar](#)—March 12 & 15, 2012
- [Tools and Practices for Implementing Green Leasing](#)—March 26, 2012
- [Update on the 2012 Commercial Building Energy Consumption Survey](#)—April 10, 2012
- [High Efficiency Troffer Specification v3.0](#)—April 19, 2012
- [Refrigerated Display Case Controls](#)—June 25, 2012
- [Whole Building Energy Modeling—Reducing Modeling Time with the OpenStudio 0.8 User Interface and the Building Component Library](#)—June 28, 2012
- [Hydrocarbon Refrigerants in Self-Contained Commercial Refrigeration Equipment](#)—July 30, 2012
- [Energy-Goal-Based Building Procurement: Achieving 90% Energy Savings in a Parking Structure](#)—August 8, 2012
- [Overview of the Lighting Energy Efficiency in Parking \(LEEP\) Campaign](#)—September 27, 2012

WHAT TO EXPECT IN 2013

Introduction of the Technology Performance Exchange



In 2013, DOE will release the first version of its Technology Performance Exchange. The Exchange is meant to be a one-stop shop for specifiers, procurement officials, and other consumers to find information regarding the performance of various energy saving technologies. The goals of the Exchange are to:

1. Empower building owners and operators to reduce their facilities' energy consumption by providing information about cost-effective, energy-efficient technologies and strategies
2. Mitigate the associated risks of using best-in-class, emerging, or otherwise underutilized technologies.

The Exchange will include links to resources such as third party and manufacturer testing results as well as opportunities to compare products and technologies side-by-side. By providing the data necessary to predict credible energy savings, the Exchange will allow end users to evaluate the site-specific performance of various technologies, enabling them to conduct more effective financial analyses and make well-informed procurement decisions.



Expanded Training Opportunities



DOE and partners will continue to offer free building re-tuning training in 2013 (see page 24). Two re-tuning curricula have been developed, including one for larger buildings with automated energy management systems

and another for smaller, less sophisticated buildings without an energy management system. DOE is also in the process of identifying needs for future trainings, such as advice on specifying efficient technologies and equipment in new build situations. We look forward to providing more opportunities for Alliance members to participate in these training sessions as they are planned and offered around the country.

Enhanced Resource Center

The Commercial Buildings Resource Database offers a wealth of information, research, case studies, and reports on a variety of energy-saving strategies in building design, construction, operations, and maintenance. In 2013, DOE will be updating this resource to make key resources easier to find, as well as expanding its offerings through the Better Buildings Solution Center—a one-stop shop for commercial building information and resources to help building owners, managers, and occupants identify solutions to common market barriers.

Efficiency Forum

The Alliance will host the 2013 Efficiency Forum at NREL in Golden, Colorado. Dates will be announced by January 2013—be sure to check Commercialbuildings.energy.gov/alliance for details.



TECHNOLOGY SOLUTIONS

Following are reports from each CBEA Project Team on the status of their work at the conclusion of FY2012 on September 30.

Newer, more efficient commercial building technologies have the potential to substantially reduce energy consumption while improving building occupant comfort and saving money. The Energy Information Agency estimates that between now and 2035, commercial buildings could save up to 24.6 quadrillion Btus by using currently available best-in-class technologies. That is equivalent to the energy content of over 12 million rail cars full of coal!¹

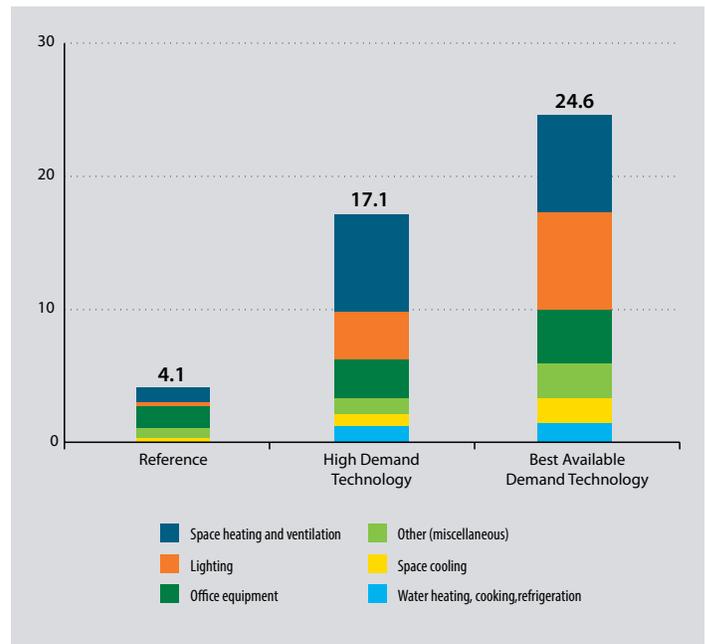
CBEA technology teams are working to help realize these savings by demonstrating high performance technologies, sharing experiences, and developing specifications that catalyze innovation and help members procure higher-efficiency commercial products.

2012 Highlights:

- Released five new specifications, doubling the number of CBEA specifications. Nationwide, if everyone switched today to technologies that meet these new specifications, we would save approximately 66 TWh of energy and over \$5.5 billion annually.
- Announced first product to meet the Rooftop Unit (RTU) Challenge, Daikin-McQuay's Rebel.

What to Expect in 2013:

- Two new Project Teams focused on data centers and energy management systems.
- Two new technology specifications for lighting and wireless sub-meters.
- New Technology Performance Exchange to help commercial building owners and operators compare the efficiency and performance characteristics of alternative technologies.
- Enhanced technology demonstration program coordinated with GSA's Green Proving Ground.



Commercial building energy consumption reduction scenarios, 2011-2035 (quadrillion Btu). Source: EIA Annual Energy Outlook 2012, p. 28

Contact information:

Jason Koman, DOE Technology Teams Coordinator
202-287-1578

Jason.Koman@ee.doe.gov

Commercialbuildings.energy.gov/alliance

1. Assumes average heat content of coal = 21.92 MMBtu per metric ton and 90.89 metric tons of coal per rail car.

Technology Specifications

CBEA released five new specifications in 2012, doubling the number of energy-saving Alliance specifications. If everyone switched to technologies that met these specifications today, we would approximately 66 TWh of energy and over \$5.5 billion each year! These customizable specifications can be used in writing requests for proposals (RFPs) from vendors and are used in actual procurement documents used by businesses that participate in the Alliance. Find them online at Commercialbuildings.energy.gov/technologies. Additional procurement resources are available at www.energystar.gov and femp.energy.gov.

Heating, Cooling and Ventilation

Gas unit heaters. An older gas-unit heater operated for 2,000 hours a year can cost up to \$5,700 each year in energy costs. A new heater that meets the specification will use 10 percent less energy and could save \$2,900 over five years in a state with a climate like Tennessee and up to \$3,600 in a cold-climate state like New York.

Rooftop air conditioning units. RTUs are used in nearly half of all cooling conditioned commercial floor space in the United States. RTUs built according to the specification are expected to reduce energy use by as much as 50 percent compared to the current ASHRAE 90.1 standard, depending on facility location and type.

Fume hoods. Replacing a conventional fume hood with one that meets the specification could save up to 50,000 kWh of energy and \$5,000 over five years, while also reducing space-conditioning energy loads.

Lighting

Lighting troffers. Fifty percent of all commercial fluorescent lighting fixtures are recessed troffers in 1'x4', 2'x2', and 2'x4' configurations, in operation for more than 10 hours a day on average and collectively consuming more than 87 TWh of electricity annually. Building owners who use the high-efficiency troffer specification can save 15-45 percent on their lighting energy costs on a one-for-one replacement basis and up to 75 percent with the use of lighting controls.

Parking lots and structures. Parking lots and structures frequently have older high-intensity discharge (HID) lighting technology without any energy-saving controls. New lighting technologies with controls can cut parking lot lighting energy bills by 40 percent or more while delivering additional benefits including long life, reduced maintenance costs, and improved lighting uniformity.

Display cases. The Refrigerated Display Case Specification delivers approximately 50 percent energy savings compared to a typical display case lighting code.

Technology Project Teams

- **Lighting and Electrical**
Lead: Linda Sandahl, Pacific Northwest National Laboratory (PNNL)
503-417-7554
Linda.Sandahl@pnnl.gov
- **Space Conditioning**
Lead: Michael Deru, National Renewable Energy Laboratory (NREL)
303-384-7503
michael.deru@nrel.gov
- **Plug and Process Loads**
Lead: Michael S. Sheppy, NREL
303-275-4357
Michael.Sheppy@nrel.gov
- **Refrigeration**
Lead: Bill Goetzler, Navigant
781-270-8351
wgoetzler@navigant.com
- **Food Service**
Lead: Richard Shandross, Navigant
781-270-8391
Richard.Shandross@navigant.com
- **Laboratories**
Lead: Paul Mathew, Lawrence Berkeley National Laboratory (LBNL)
510-486-5116
pamathew@lbl.gov

Refrigeration

Ultra-low temperature freezers (ULFs). A typical ULF can use up to 20 kWh of electricity per day—as much as a small house! Replacing it with a unit that meets the specification could save up to 3,000 kWh per year, saving as much as \$1,500 over five years. This specification is expected to be finalized in 2013.

Plug and Process Loads

Low voltage distribution transformers. An older transformer in a typical 45,000-square-foot office building can consume 16,000 kWh and cost more than \$1,500 in electricity costs per year; replacing it with a transformer that meets the specification could save up to \$5,000 over five years.

Commercial heat pump water heaters. An older, electric resistance water heater operated in a building with a hot water demand of 500 gallons a day, 365 days a year, can cost more than \$3,500 each year in electricity costs. A new heat pump water heater that meets the specification would use 70 percent less energy and could save \$12,500 over five years.

TECHNOLOGY SOLUTIONS: Lighting and Electrical



Commercial lighting uses about 4.0 quads of primary energy per year, which is over 20 percent of total commercial building energy use. Fortunately, lighting often provides some of the easiest, most cost-effective energy-saving opportunities for building owners and occupants. Lighting and Electrical Project Team members reduce lighting energy use by sharing cost-effective solutions to interior and exterior lighting challenges and developing lighting specifications to build demand for higher-efficiency technology.

2012 Highlights:

- Released two new lighting specifications and updated three others, with savings potential of up to 102 TWh.
- Launched the Lighting Energy Efficiency In Parking (LEEP) Campaign with BOMA, IFMA, and the Green Parking Council. The lighting team is serving as a technical advisor to the Campaign, which heavily leverages CBEA specifications.
- Helped building owners and managers quickly determine their eligibility for the lighting 179D tax deduction using DOE's new tool, the 179D Calculator at 179d.energy.gov. This free tool generates a report that satisfies IRS documentation requirements.
- Lighting specifications applied at nearly 800 member sites as of September 2012, representing projected savings of over 57 million kWh annually.²



Walmart used the CBEA Troffer Lighting Specification as the basis to develop bid specifications for these products.

-Ralph O. Williams, Walmart

GSA was heavily involved in development of the CBEA High-Efficiency Troffer Specification, and is currently conducting Green Proving Ground demonstration projects to demonstrate the energy-savings potential of these products. If they perform as anticipated, GSA plans to roll out this specification more broadly across its building portfolio.

-Kevin Powell, GSA

What to Expect in 2013:

- Recruiting participants for the LEEP Campaign (see page 20) to help parking lot and structure owners take advantage of low-cost energy saving opportunities in these often-overlooked spaces.
- Update to troffer specification.
- Demonstrations and guidance on adaptive exterior lighting controls, such as bi-level and dimming controls.
- Release of one new lighting specification for exterior lighting.

Contact information:

Linda Sandahl,
Lighting and Electrical Project Team Lead
503-417-7554

Linda.Sandahl@pnnl.gov
Commercialbuildings.energy.gov/alliance

2. These 793 sites represent projects that are either completed, in construction, or in the design phase. Of the 793 sites, 421 were parking lots (89% of the kWh savings); 8 were parking structures (3% of the kWh savings); and 364 were refrigerated display cases (8% of the kWh savings) for total savings of 57,289,755 kWh annually.

The Lighting Energy Efficiency in Parking (LEEP) Campaign

The CBEA Parking Lot and Parking Structure specifications can deliver energy savings of about 40 percent compared to a typical code and 75 percent or more with controls. Nationwide, if all parking lots and structures switched to high-efficiency lighting that meets the requirements of the specification, we could save over 75 TWh annually.



In 2013, the Lighting and Electrical Project Team expects to significantly expand the use of its exterior lighting specifications and other resources by teaming up with BOMA, IFMA, the Green Parking Council and numerous supporting organizations on the LEEP Campaign. The Campaign encourages businesses to take advantage of lighting energy savings opportunities in their parking spaces. LEEP participants commit to retrofitting or building new parking structures with high-efficiency lighting technology, and the Campaign provides guidance and recognition to participants. Participants will be eligible for a variety of award categories including largest portfolio-wide energy savings, largest number of site upgrades, and best use of controls. The Campaign is planned to run through February 2014. To join, visit LEEPCampaign.org.

Lighting Specifications

The Lighting and Electrical Project Team currently maintains the lighting specifications listed on page 21, with plans to add more in 2013. These customizable specifications can be used to aid in writing RFPs from vendors and are included in actual procurement documents used by CBEA members. Specifications include default recommendations for a variety of lighting characteristics, which you can modify as necessary to suit your building's needs.

Find these specifications and others at Commercialbuildings.energy.gov/technologies.

Lighting and Electrical Project Team Members

Owners/Operators:

Best Buy Co., Inc.
 BJ's Wholesale Club, Inc.
 Boston Market Corp.
 CB Richard Ellis Group, Inc.
 CC Frost Properties, Ltd.
 CentraCare Health System
 Cleveland Clinic
 Costco Wholesale Corp.
 Food Lion, LLC
 Health Care REIT
 HealthSouth
 IASIS Healthcare
 Jones Lang LaSalle
 Kaiser Permanente
 Kimco Realty Corp.
 Kohl's Department Stores
 Lamey-Wellehan Shoes
 Legacy Health System
 McDonald's Corp.
 MGM Resorts International
 OfficeMax Inc.
 PetSmart, Inc.
 Publix Super Markets
 Rosemont Realty
 Ryan Companies US, Inc.
 Safeway Inc.
 Sinai Health System
 Staples, Inc.
 Target Corp.
 The Home Depot, Inc.
 The PNC Financial Services Group, Inc.
 The Related Companies, L.P.
 University of Maryland

University of Maryland Medical Center
 USAA Real Estate Co.
 U.S. Department of Veterans Affairs
 U.S. General Services Administration
 Veterans Health Administration
 Walgreen Co.
 Walmart Stores, Inc.
 Wawa, Inc.
 Whole Foods Market, Inc.

Other Participants:

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
 Green Parking Council
 Illuminating Engineering Society of North America (IES)
 International Facility Management Association (IFMA)
 Professional Retail Store Maintenance Association

Italics indicate HEEA Project Team representative

High-Efficiency Troffer (1'x4', 2'x2', 2'x4') Lighting

Specification: Fifty percent of all commercial fluorescent lighting fixtures are recessed troffers in 1'x4', 2'x2', and 2'x4' configurations, in operation for more than 10 hours a day on average and collectively consuming more than 87 TWh of electricity annually. Building owners who use the high-efficiency troffer specification can save 15-45 percent on their lighting energy costs on a one-for-one basis and up to 75 percent with the use of lighting controls. If all troffers were replaced to specification-compliant troffers, 26 TWh of electricity could be saved annually.



LED Site (Parking Lot) Lighting Specification: Most parking lots are illuminated by HID lighting technology without any energy-saving controls. New light-emitting diode (LED) technology with controls can cut parking lot lighting energy bills by 40 percent or more while delivering additional benefits including long life, reduced maintenance costs, and improved lighting uniformity. Nationwide, if all parking lots switched to high-efficiency lighting that meets the requirements of the specification, we could save an estimated 40 TWh annually.

High-Efficiency Parking Structure Lighting Specification:

Parking structures or garages are often lit by older HID lighting technology without any energy-saving controls. The latest high-efficiency alternatives with energy-saving controls—including fluorescent, induction, and LED options—can save building owners over 40 percent on their parking lot lighting bills compared to typical code while delivering additional benefits, like better-lighted spaces. Additional energy savings are possible from the use of lighting controls and daylighting. Nationwide, if all parking structures switched today to high-efficiency lighting that met the requirements of the specification, businesses could save an estimated 36 TWh annually.



LED Refrigerated Display Case Lighting Specification: The Refrigerated Display Case specification delivers approximately 50 percent energy savings compared to a typical display case lighting code. If all retail refrigerated display cases switched to LED systems today, 2.1 TWh of electricity could be saved annually.



TECHNOLOGY SOLUTIONS: Space Conditioning



Commercial space conditioning (heating, cooling, and ventilation) accounts for about 7.0 quads of primary energy per year, or about 40 percent of total commercial use. However, there are many cost-effective opportunities to reduce space-conditioning energy use, such as tuning up existing systems, reducing supplemental energy loads to minimize the burden on heating and cooling systems, and replacing older equipment with new, high-efficiency equipment. CBEA Space Conditioning Project Team members work together with DOE's national laboratories to deploy these and other energy-saving, space-conditioning strategies.

2012 Highlights:

- Welcomed participating manufacturers to the RTU Challenge: Daikin McQuay, Carrier, Lennox, 7AC Technologies, and Rheem.
- Announced first product to meet the RTU Challenge, Daikin McQuay's Rebel.
- Released the Gas Heater Specification. If all gas-unit heaters in the United States were replaced with heaters built to the energy requirements in this specification, businesses could save 0.54 billion therms of energy, or about \$400 million in energy costs per year.
- Helped building owners and managers quickly qualify for the 179D tax deduction for energy efficiency improvements using DOE's new tool the 179D Calculator, available at 179d.energy.gov.



The RTU calculator was a very successful project and should be advertised and promoted more.

*-Paul Holiday, former Director of Engineering,
Lowe's Companies, Inc.*

CBEA is a good forum for open discussions between members that can lead to valuable information exchanges...

-Scott Williams, Target

What to Expect in 2013:

- Pilot RTU retirement campaign.
- Demonstrations of High Performance RTU Challenge units.
- Demonstration of advanced RTU controls.
- Demonstrations of advanced gas heater specification.

Contact information:

Michael Deru, Space Conditioning Project Team Lead
303-384-7503

michael.deru@nrel.gov

Commercialbuildings.energy.gov/alliance

RTU Retirement Campaign

Packaged HVAC units, including RTUs, serve the cooling needs for about 60 percent of commercial building floor space. Many of these RTUs are more than ten years old and still have at least five years of service, but they have a low operating efficiency compared to new units. Replacing these old units with new, high-efficiency RTUs can save up to 50 percent of the RTU energy. Alliance members have come forward as leaders and early adopters, expressing interest in replacing older equipment with high-efficiency RTUs via the RTU Challenge. However, challenges to widespread adoption of efficient RTUs remain, including lack of awareness of the potential savings, lack of trust that savings will actually be realized, hesitance to spend money replacing equipment that has not yet reached the end of its life, and uncertainty regarding technologies best suited for each building's particular needs. The RTU retirement campaign will address these barriers by helping people take advantage of technical and financial assistance, providing compelling case studies, and recognizing significant accomplishments. DOE will provide technical support to the campaign via its National Renewable Energy Laboratory, and welcomes the help of interested stakeholders in identifying resources that can help make this campaign a success. Contact the Space Conditioning Project Team lead for more information.

Gas Heater Specification

An older gas-unit heater operated for 2,000 hours a year can cost up to \$5,700 each year in energy costs. A new heater that meets the specification will use ten percent less energy and could save \$2,900 over five years in a state with a mild climate such as Tennessee and up to \$3,600 in a cold-climate state like New York. If all gas-unit heaters in the United States were replaced with heaters built to the energy requirements in this specification, businesses could save 0.54 billion therms of energy, or about \$400 million in energy costs per year. The initial cost of a high-efficiency gas-unit heater can be a barrier to implementation. Limited information is available for engineers on the operating characteristics and best practices for sizing and locating high-efficiency gas-unit heaters. To address these additional challenges, the team developed a web page with additional information, guidance on when to use the specification, links to incentives, and energy savings calculators. Find the specification at Commercialbuildings.energy.gov/technologies.

Advanced RTU Control Retrofit Demonstration

Most existing RTUs have constant speed supply air fans and have rudimentary controls, which limit energy performance. Current RTUs do not offer standard on-board communications for performance and control adjustments. Application of an

Space Conditioning Project Team Members

Owners/Operators:

Adventist HealthCare	The Walt Disney Co.
Beaumont Health System	U.S. Department of Veterans Affairs
CB Richard Ellis Group, Inc.	U.S. General Services Administration
Hospital Corporation of America	Walgreen Co.
Jones Lang LaSalle	Walmart Stores, Inc.
Legacy Health System	Wawa, Inc.
Living City Block	Whole Foods Market, Inc.
Mayo Clinic	
PetSmart, Inc.	Other Participants:
Publix Super Markets	American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Starbucks Coffee Company	Professional Retail Store Maintenance Association
Summa Health System	
Target Corp.	
Texas Children's Hospital	
The Home Depot, Inc.	

advanced controller can provide energy savings between 24-35 percent and cost savings of 38 percent. Annual savings of 55 trillion Btus are possible assuming half of RTUs are retrofitted with an average savings of 30 percent. At the [2012 CBEA Efficiency Forum](#), members cited the limited information available for owners and engineers on the savings potential and operational characteristics from newly available solutions on the market. Members are concerned about potential additional O&M requirements and about the impact on the operation of the existing RTU. To address these concerns, DOE is conducting demonstration projects to provide better data on energy savings, costs, and operational characteristics of this technology. In addition, DOE published two reports that investigate various control strategies and provide savings estimates for all U.S. climate zones; these and other reports are available at Commercialbuildings.energy.gov/resources:

- [Energy Savings and Economics of Advanced Control Strategies for Packaged Air-Conditioning Units with Gas Heat](#)
- [Energy Implications of Retrofitting Retail Sector Rooftop Units with Stepped Speed and Variable Speed Functionality](#)



Commercial plug and process loads—which include computers, printers, fax machines, beverage dispensers and ATM machines—account for nearly four quads of primary energy per year, or about 20 percent³ of commercial building energy use. In recent years, this has been one of the fastest-growing areas of building energy use. Nevertheless, plug loads can provide some of the easiest, most cost-effective energy-savings opportunities. CBEA Plug and Process Loads (PPL) Project Team members work to develop metering, design, procurement, and operational strategies to improve the efficiency of plug and process equipment and reduce unnecessary use of idle or duplicative equipment.

2012 Highlights:

- Provided members with low- and no-cost recommendations to reduce plug load energy use, such as establishing formal plug load management and procurement policies and procuring ENERGY STAR[®] qualified equipment.
- Increased dissemination of recently published plug load guidance and checklists for office and retail buildings.
- Released a new CBEA specification for distribution transformers. An older transformer in a typical 45,000-square-foot office building can consume 16,000 kWh and cost more than \$1,500 in electricity costs per year; replacing it with a transformer that meets this specification could save up to \$5,000 over five years.



This is a great worksheet! It has concise info and a checklist to follow...It has a lot of very good information and appears easy to use...

-Feedback from GSA employees on the Assessing and Reducing Plug and Process Loads in Office Buildings fact sheet

These have been two of the most relevant, useful days I have spent this year.

-Noah Shlaes, Newmark Grubb Knight Frank, attendee of PPL Project Team breakout sessions at the CBEA Efficiency Forum

What to Expect in 2013:

- Continued emphasis on energy-efficient procurement by leveraging resources such as those from ENERGY STAR and the Federal Energy Management Program (FEMP) [Commit to Efficiency Campaign](#).
- Guidance on plug and process capacity needs for commercial building owners and occupants negotiating tenant leases or planning occupant spaces.
- Updates about DOE and ENERGY STAR work to develop test procedures that can be used to compare energy performance of medical equipment.

Contact information:

Michael S. Sheppy, Plug and Process Loads Project Team Lead
303-275-4327

Michael.Sheppy@nrel.gov

Commercialbuildings.energy.gov/alliance

3. Based on 2010 estimates in the 2012 Buildings Energy Databook, Table 3.1.4, including electronics, computers, and other equipment.

Low- and No-Cost Recommendations to Reduce Plug Load Energy Use

Process and plug loads offer many low- and no-cost opportunities for energy savings. The CBEA PPL Project Team offers tips, guidance, sector-specific checklists, and example strategies from other members on its [web page](#).

Distribution Transformer Specification

Distribution transformers built for commercial buildings according to the new CBEA specification can reduce energy use by more than 15 percent, compared with typical transformers.⁴ An older transformer in a typical 45,000-square-foot office building can consume 16,000 kWh and cost more than \$1,500 in electricity costs per year; replacing it with a transformer that meets the specification could save up to \$5,000 over five years. If all distribution transformers in U.S. commercial buildings were replaced with transformers that met the energy requirements in this specification, businesses could save 3.2 TWh of energy, or about \$310 million in energy costs per year.⁵ Find the specification and helpful implementation guidance at Commercialbuildings.energy.gov/technologies.

PPL Capacity Analysis

Commercial building occupants and real estate brokers need better information about realistic PPL capacities when they set infrastructure needs. Industry partners have reported that tenants typically request a PPL capacity of 5-10 W/ft² in their lease agreements. Limited initial data suggest that actual PPL densities in leased buildings are substantially lower. Oversizing a building's electrical infrastructure increases upfront capital costs and energy consumption; it may also increase cooling system sizing and subsequently increase HVAC system costs. In 2013, the PPL Project Team will work with members and industry stakeholders to assess commercial office plug and process load needs and provide reliable guidance to address the current information gap.

4. CBEA Fact Book Assumptions: Typical baseline efficiency for 75 kVA unit meets proposed DOE efficiency levels: 98.47% ([DOE Distribution Transformer NOPR](#))

5. CBEA Fact Book Assumptions: cost of electricity: \$0.1019/kWh ([AEO 2012](#)); installed stock: 6,000,000 ([TIAX, 2010](#)); hours of operation per year: 8,760 (scenario assumption); rated capacity: 75 kVA (scenario assumption); loading factor: 35% (scenario assumption)

Plug and Process Loads Project Team Members

Owners/Operators:

AtSite

CB Richard Ellis Group, Inc.

First Potomac Realty Trust

Glenborough, LLC

Grand Valley State University

Gundersen Lutheran Health System

Hines

Legacy Health System

Newmark Grubb Knight

Frank Global Corporate Services

PeaceHealth

Stanford University

The Home Depot, Inc

University of Maryland Medical Center

U.S. General Services Administration

Wawa, Inc.

Other Participants:

American Society for Healthcare Engineering (ASHE)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Italics indicate HEEA Project Team representative

Test Procedures to Quantify Energy Use of Medical Equipment

DOE is in the process of developing and evaluating test procedures for medical equipment in support of the ENERGY STAR program. Consistent, standardized energy test procedures are important because they enable purchasers to compare the energy performance of similar products. While development of a test procedure does not guarantee an ENERGY STAR label for efficient medical equipment, it is an important first step toward improved purchasing practices. The PPL Project Team will provide members with updates about opportunities to provide input on test procedures as they are developed throughout 2013.



Commercial refrigeration equipment collectively accounts for about 1.3 quads of primary energy use per year, which is roughly seven percent of total national commercial energy consumption. In grocery stores, convenience stores, and restaurants, refrigeration can account for up to half of a building's total energy use. CBEA Refrigeration Project Team members work to improve the efficiency of new refrigeration equipment, including display cases, coolers and freezers, compressor systems, and controls. Members also focus on improving the energy efficiency of existing refrigeration systems through operational procedures or retrofit options.

2012 Highlights:

- Released guide to best practices for retrofitting doors on open display cases. Approximately 90 percent of all medium-temperature supermarket display cases are open cases. If these cases were all retrofitted with doors today, the national annual energy savings would be nearly 2.5 TWh, with supermarkets saving \$250 million in energy costs.
- Developed refrigeration commissioning technical procedures document. Studies have indicated that supermarkets can achieve up to 25 percent energy savings through commissioning.⁶ This document details the procedures necessary to properly commission refrigeration systems.



The CBEA partnership brings together technical and business professionals from competing companies to define and solve industry problems. Serving as a third-party facilitator and technical participant, the DOE Team has developed a very successful private-public voluntary group capable of solving complex issues far more quickly than if each of the parties worked separately. This brings validated solutions to our entire industry sector faster.

-Richard Heath, SUPERVALU

What to Expect in 2013:

- Developing low global-warming-potential (GWP) refrigeration systems case studies. Many members are interested in new, energy-efficient refrigeration systems that also utilize refrigerants with lower global warming potential. A cross-program collaboration to develop case studies on such systems in the field would highlight these benefits to Alliance members.
- Issuing a compressor rack specification. Compressor racks consume an estimated 0.37 quads (108 TWh) of source energy annually and have significant opportunities for improvement that can be encouraged through a specification.
- Working with ASHRAE as they develop a commissioning best practices guide for supermarket refrigeration systems intended for industry use.
- One or more refrigeration technology demonstration projects.

Contact information:

Bill Goetzler, Refrigeration Project Team Lead
781-270-8351

wgoetzler@navigant.com

Commercialbuildings.energy.gov/alliance

6. Sources: Portland Energy Conservation, Inc. (PECI); Food Marketing Institute (FMI) presentation for EPA GreenChill program

Installing Doors on Open Refrigerated Display Cases

Open refrigerated display cases consume a significant amount of energy, using up to three times the energy of similarly configured cases with doors. Today, approximately 90 percent of all medium-temperature supermarket display cases are open cases. Adding doors to open refrigerated display cases can save a typical supermarket more than \$40,000 in energy costs per year. However, if the retrofit is not performed properly, it can adversely impact system operation, leading to poor reliability and system performance. This is complicated by the fact that there are no industry-standard best practices for conducting open case retrofits and adjusting the refrigeration system as needed. The CBEA Guide for the Retrofitting of Open Refrigerated Display Cases with Doors—developed with the input of Project Team members, equipment manufacturers, and experienced refrigeration engineers—helps overcome these challenges by providing guidance and recommendations to maximize energy savings when adding doors to previously open display cases. If all open refrigerated cases were retrofitted today with display doors, the national annual energy savings would be nearly 2.5 TWh, with supermarkets saving \$250 million in energy costs. Look for the guide on the Refrigeration Project Team page at Commercialbuildings.energy.gov/alliance.

Commissioning Supermarket Refrigeration Systems

Studies have indicated that supermarkets can achieve up to 25 percent energy savings through commissioning. This is important because a typical supermarket spends \$180,000 per year on refrigeration energy costs. Assuming an average of ten percent energy savings, supermarkets could see a collective national savings of up to 6.6 TWh of energy, or about \$675 million in energy costs per year by properly commissioning their refrigeration systems. In 2012, the Refrigeration Project Team produced a document that lays out technical procedures for commissioning these systems. Throughout 2013, the Refrigeration Project Team will work with ASHRAE as they develop a refrigeration commissioning guide — helping retailers inside and outside the Alliance benefit from this energy-savings opportunity.

Compressor Rack Specification

Compressor racks consume an estimated 0.37 quads (108 TWh) of source energy annually and have significant opportunities for improvement. Refrigeration Project Team members represent a

Refrigeration Project Team Members

Owners/Operators:

Food Lion, LLC
 Fresh & Easy
 Neighborhood Market
 Harris Teeter Inc.
 Publix Super Markets
 Safeway Inc.
 SUPERVALU INC.
 Target Corp.
 Walgreen Co.
 Walmart Stores, Inc.
 Wawa, Inc.

Weis Markets
 Whole Foods Market, Inc.
 Yum! Brands

Other Participants:

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
 NACS (The Association for Convenience and Fuel Retailing)

sizeable portion of the estimated 140,000 installed base of compressor racks and can help to spur the development of more efficient technologies by developing a performance specification. In 2013, Refrigeration Project Team members will work in consultation with system designers and refrigeration engineers to develop an end-user set of technical requirements that can be provided to equipment manufacturers and vendors during equipment procurement. This will help companies purchase currently available “best-in-class” equipment. Depending on the feasibility and potential cost-effectiveness of further technical improvements, the Refrigeration Project Team may also issue a “challenge specification,” encouraging manufacturers to innovate to a higher level of efficiency than what is currently on the market today.

Demonstration Projects

The team is considering several possible demonstration projects in 2013. For open case retrofits, the team would find a retail partner to serve as a site for demonstration of the practices included in the guide. Independent verification of energy consumption before and after open case retrofits performed in accordance with these best practices would provide supporting data for future deployment and promotion activities. A field study could also be performed to demonstrate the effectiveness of the procedures outlined in the commissioning guide. If you are interested in participating in a demonstration, contact the Refrigeration Project Team lead.



Through involvement in the Laboratories Project Team, I look forward to learning and sharing methods to save energy in our lab energy costs. Involvement in programs such as “fume hood sash management” and “optimize minimum air change rates” will help us take advantage of those savings.

*-Michael Ochs, CIH, Assistant Director,
ASU EH&S Department*

Laboratory facilities are very energy intensive, with usage ranging from 250 kBtu/ft² to 800 kBtu/ft², or about 3-8 times as much as an average office building. On a university campus, labs can constitute 40-50 percent of total energy use, even though they may constitute less than 20 percent of the total floor space. Laboratories have many unique efficiency opportunities that require specialized expertise. Laboratories Project Team members reduce laboratory energy use by implementing low-cost operational best practices, developing specifications to build demand for more efficient laboratory equipment, and sharing information on cost-effective energy-efficiency measures.

2012 Highlights:

- Kicked off the fume-hood sash management program. A single laboratory fume hood can consume as much energy as three average homes, so a laboratory with dozens of fume hoods consumes as much energy as a small neighborhood!
- Released the fume hoods specification to help members purchase efficient equipment. Replacing a conventional fume hood with one that meets the specification could save up to 50,000 kWh of energy and \$5,000 over five years, while also reducing space conditioning energy loads. If all fume hoods in the U.S. were replaced today with fume hoods that met the energy requirements in this specification, laboratories could save 7.5 TWh of energy, or about \$760 million in energy costs per year.
- Started developing the ultra-low temperature freezer (ULF) specification. A typical ULF can use up to 20 kWh of electricity per day—as much as a small house! Replacing it with a unit that meets the specification could save up to 3,000 kWh per year, saving as much as \$1,500 over five years.

The Laboratories Project Team is a good mechanism for staying current with the state of the art of what other campuses are doing in developing sustainable research laboratories. It is important to understand best practices for, and the savings potential of, our campus program activities, such as the “shut the sash” campaign. Participation in the CBEA program will be an important asset for our lab energy conservation effort.

-Ralph Stuart, Cornell University

What to Expect in 2013:

- Focus on three additional best practices: optimizing minimum air-change rates, reducing simultaneous heating and cooling, and laboratory freezer energy management.
- Demonstration projects to quantify the real-world energy savings from high-efficiency fume hoods and laboratory freezers.



Contact information:

Paul Mathew, Laboratories Project Team Lead

510-486-5116

pamathew@lbl.gov

Commercialbuildings.energy.gov/alliance

Fume Hood Sash Management

A single fume hood in a typical lab can use more than 10,000 kWh per year. Reducing fume hood energy use can be as simple as training laboratory users to shut the sash when not using it. A case study published by DOE showed that fume hood sash management in a laboratory building at the University of California, Santa Barbara, resulted in savings of \$1,300 per hood. The same study estimated that sash management in a laboratory building at University of California, Davis, had a simple payback of 15 minutes!

Although fume hood sash management is a proven energy-saving practice, the challenge of getting laboratory users to close sashes when not in use persists. Many facilities personnel give up on such “behavioral” measures, even when they are proven to very cost effective. By sharing best practices and creating simple to use implementation guides and resources (sash stickers, “shut the sash” competitions), Laboratories Project Team members are increasing adoption of this measure and ensuring that the savings are sustained over time.

Get involved or start your own fume hood sash management challenge by using the resources available on the [Laboratories Project Team web page](#).

Optimizing Minimum Air-Exchange Rates

Fresh air exchanges in labs are important for safety, but too many air exchanges per hour can negatively impact both safety and efficiency. Optimizing air exchange rates can save a significant amount of money and energy. For example, by optimizing air exchange rates in laboratory buildings, the University of Colorado, Boulder, estimates that it will reduce *campus* energy use by about 15 percent.

Reducing Simultaneous Heating and Cooling

Simultaneous heating and cooling is as inefficient as it sounds, yet it is a very common practice in today’s commercial buildings. Laboratories Project Team members work to track and reduce simultaneous heating and cooling. A Labs21 study showed that strategies to reduce reheat energy use can result in 11-14 percent total source energy savings.⁷

7. Minimizing Reheat Energy Use in Laboratories. U.S. Department of Energy and U.S. Environmental Protection Agency, August, 2005. Prepared by Lawrence Berkeley National Laboratories. http://www1.eere.energy.gov/femp/program/labs21_bmp.html

8. Room Temperature Storage of Biological Samples: Labs 21 Technical Bulletin. U.S. Department of Energy and U.S. Environmental Protection Agency, March, 2011. Prepared by Lawrence Berkeley National Laboratories. http://www1.eere.energy.gov/femp/pdfs/bulletin_rtss_508.pdf

Laboratories Project Team Members

<i>Arizona State University</i>	<i>University of California, Berkeley</i>
<i>Clark Atlanta University</i>	<i>University of California, Davis</i>
<i>Cleveland Clinic</i>	<i>University of California, Irvine</i>
<i>Cornell University</i>	<i>University of Maryland</i>
<i>Duke University</i>	<i>University of Pittsburgh Medical Center</i>
<i>Grand Valley State University</i>	
<i>Stanford University</i>	
<i>Tulane University</i>	

Italics indicate HEEA Project Team representative

Laboratory Freezer Energy Management

A typical ULF can use as much electricity as a small house! Managing temperature settings and replacing or eliminating older freezers can save thousands of dollars each year. For example, a recent technical bulletin published by the Labs21 program showed that the use of room temperature sample storage can save \$1,320-\$3,250 annually for each ULF replaced.⁸

Demonstration Projects

Fume hoods and ULFs are among the most energy-intensive equipment in the laboratory setting. While high-efficiency options for these technologies are commercially available, their wider adoption is limited because of uncertainty about return on investment and concerns about reliability. To reduce this uncertainty, DOE will conduct field testing of these technologies across several university and industry sites, focusing on the performance *as operated in actual use*.

Fume hood demonstrations will focus on several new product classes including low flow hoods, low flow hood retrofit kits, and automatic sash closure systems for variable air volume fume hoods. These will be demonstrated with participating Labs21 members through Lawrence Berkeley National Laboratory (LBNL). ULF demonstration projects will also be carried out by this team. Laboratories Project Team members interested in taking part in a demonstration of either of these products are encouraged to contact the Laboratories Project Team lead.



MARKET SOLUTIONS

Often, commercial buildings owners, managers, and tenants are unable to take full advantage of energy-efficiency benefits due to market barriers such as split incentives, difficulty securing financing, lack of transparent building energy data, or insufficient workforce training. Members of the Market Solutions Project Team collaborate with DOE and the wider commercial building marketplace to identify solutions to help overcome these non-technical barriers. The team also works with DOE and external industry partners to increase the speed and scale at which they can improve adoption of building efficiency resources in the market.

2012 Highlights:

- Published two detailed case studies and launched the Green Lease Library with seven partner stakeholder organizations; www.greenleaselibrary.com is now a top online resource for energy-aligned leasing.
- Trained 22 building professionals at 11 companies to re-tune commercial buildings for energy savings of up to 5-20 percent in HVAC systems alone.
- Launched the LEEP Campaign in cooperation with the Lighting and Electrical Project Team.



The Market Solutions Project Team is one of the most useful programs we have participated in to date. We have found that the team provides useful effective tools and resources, and the level of communication is balanced and responsive.

-Sara Schoen, Manager, Energy and Sustainability, First Potomac Realty Trust

I have been to a lot of seminars and trainings in my day and I will say the re-tuning training really focused on actionable steps the operating engineer can take to capture energy savings while maintaining occupant comfort.

-Vincent Curcio, Grubb & Ellis

What to Expect in 2013:

- Helping members replicate successful strategies to overcome barriers identified in Better Buildings Challenge implementation models
- Setting energy-efficiency goals in retrofits and new construction: strategies for success.
- Publishing appraisal case studies that demonstrate how efficiency retrofits impact building value.

Contact information:

Diane Vrkic, Market Solutions Project Team Lead
415-738-4730

Dianevrkic@waypointbuilding.com

Commercialbuildings.energy.gov/alliance

Leasing and the Split Incentive Barrier

Green leasing (also known as energy-aligned leasing) creates an opportunity for building owners and operators to overcome the “split incentive” barrier to energy efficiency. This practice enables a long-term framework for allocating costs and benefits of efficiency between tenants and landlords. The split incentive barrier occurs when building leases are not structured in a way that promotes energy savings.

- Under most gross leases, for example, tenants have no incentive to save energy in their leased premises because energy costs are based on tenant square footage.
- Under most net leases, building owners have no incentive to invest in efficiency for their building systems because the operating expenses are passed through to tenants, who receive all the energy cost savings.

Green leases present a cost-effective, “win-win” structure for energy-efficiency improvements in leased spaces. They create a structure that allows tenants to pay for the investment through monthly energy savings, then continue to enjoy lower utility bills once the retrofit has been paid back in full. At one building, for example, implementing an energy-aligned lease clause allowed a landlord to install a Building Automation System that ultimately led to the building manager identifying energy savings of roughly 45 percent and a three-year payback.⁹

While green leasing presents an opportunity to overcome this barrier in the commercial buildings sector, the strategy is not implemented widely due to lack of familiarity and awareness on both the tenant’s and landlord’s parts. Either this component of the lease clause does not survive the negotiation process, or landlords are not equipped with the resources to implement the clause. Existing green leasing resources are spread across multiple organization websites and are intended for a variety of audience types with differing scopes, making it difficult for stakeholders to find the resources they need.

To address this issue, the Market Solutions Project Team coordinated with seven partner organizations to create greenleaselibrary.com, a one-stop-shop to improve access to green leasing resources. This website aggregates and organizes green leasing resources for all audience types, from building owners and tenants to lawyers and building raters.

The library offers guidance, best practices, and toolkits for developing and implementing green leases. These materials are arranged by category, audience, and building type, and offer sample lease language and case studies in which green leasing has been successfully adopted.

9. Stan Cichocki, Senior Property Manager, Brandywine Realty Trust

Market Solutions Project Team Members

Owners/Operators:

AtSite
Beaumont Health System
CB Richard Ellis Group, Inc.
CC Frost Properties, Ltd.
Colliers International
Community Services
Agency & Development
Corporation
Cushman & Wakefield Inc.
Denver West
First Potomac Realty Trust
Glenborough, LLC
InterContinental Hotels
Group
Liberty Property Trust
Living City Block
Newmark Grubb Knight
Frank Global Corporate
Services
PETCO Animal Supplies,
Inc.
Prudential Financial, Inc.
Rosemont Realty
RREEF America LLC
Starbucks Coffee Company

Stream Realty Partners,
L.P.
The JBG Companies
Tishman Speyer Properties
USAA Real Estate Co.
U.S. Department of
Veterans Affairs
U.S. General Services
Administration
U.S. Navy CNIC Facilities
and Acquisitions

Other Participants:

American Society of
Heating, Refrigerating
and Air-Conditioning
Engineers (ASHRAE)
Energy Efficiency Building
Hub (EEB Hub)
Green Parking Council
International Facility
Management
Association (IFMA)

DOE’s Building Technologies Program hosted a webinar on March 26, 2012, to discuss tools and best practices for implementing green leasing in commercial buildings. The webinar provided an overview of strategies to promote energy efficiency through green leasing and demonstrated how to use the resources in the Green Lease Library. This resource was targeted to a broad audience—from building owners and tenant organizations to lawyers and building raters—and showcased the Green Lease Library.

Visit the Green Lease Library at greenleaselibrary.com or check out the webinar [here](#).

Workforce Training and Building Re-Tuning

Building re-tuning is a low-cost form of retro-commissioning that building facility staff can implement to improve the operations of a building in terms of saving energy and money. Re-tuning buildings can reduce energy use of HVAC systems by 5-20 percent by providing building operators, managers, and service providers with the necessary skills to systematically and continually identify no- and low-cost operational problems.¹⁰ One study estimates that general commissioning practices like re-tuning can save \$30 billion per year by 2030.¹¹

DOE's Pacific Northwest National Laboratory (PNNL) developed a building re-tuning training program, which trains building operators, managers, and businesses that install and service building systems to optimally re-tune large structure (with automation) and small structure (without automation) commercial buildings. PNNL's online interactive curriculum teaches users how to assess buildings' energy needs, identify opportunities for improvement, and implement low-cost changes to reduce overall energy consumption.



The Market Solutions Project Team is promoting upcoming in-person re-tuning trainings to members. The team is also engaging with members who participate in trainings to share results with other members and within their organizations to scale this efficiency solution in the market. Trainings are intended for facilities managers who can train others in their organizations on building re-tuning as a way to deploy this best practice.

Access the free online re-tuning training curriculum at www.pnnl.gov/BuildingRetuning/.

10. <http://www.pnnl.gov/buildingretuning/index.stm>

11. Evan Mills. 2009. "Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse-gas Emissions"

Financing Retrofits

A major barrier to implementing energy-saving measures in the commercial buildings market is access to capital and high up-front costs. Innovative financing strategies, such as utility on-bill financing and PACE, provide creative solutions to address the high up-front costs of energy-efficiency projects or equipment upgrades in commercial buildings. Numerous existing financial incentives for energy-efficiency measures are available from utilities, financial and energy services companies (including the Better Buildings Challenge Financial Allies), and government organizations.



The Market Solutions Project Team is connecting CBEA members to existing innovative financing resources including on-bill financing programs and the Better Buildings Challenge Financial Allies. There are eight on-bill financing programs for which commercial buildings are eligible, and 13 Better Buildings Challenge Financial Allies have committed over \$1,675 million to promoting energy efficiency.

Find out more about Better Buildings Challenge Financial Allies at BetterBuildings.energy.gov.



THE ALLIANCE IN 2013

In 2013, DOE will continue to build upon the Alliance’s record of accomplishments by expanding our program offerings, recruiting new members, and documenting our energy-saving impacts. Through the Alliance, DOE will continue to offer top-notch information, training, and networking opportunities to drive greater energy and cost savings and U.S. competitiveness. We will also continue to support our action-oriented project teams while expanding our team coverage to new areas—such as data centers and energy management and information systems—that represent large energy-savings opportunities. DOE will be introducing a few changes and enhancements this year, including new sector account managers and simplified member sign-up, as well as benefitting from complementary efforts within DOE’s Better Buildings Initiative.

Sector Account Managers

In order to better support our growing membership, DOE is pleased to introduce sector account managers, listed below, for 2013. These individuals will keep partners informed, answer questions, and help identify activities that can contribute to your organization’s energy-saving goals. Please feel free to reach out to them. They will be periodically checking in with you as well.

Simplified Sign-up

When organizations sign up for the Alliance, they are asked to assign a representative, share their organization’s energy-saving goal, participate in at least one project team activity annually, and inform DOE of progress. In return, the Alliance commits to work with members to help them overcome efficiency challenges, provide a neutral third party platform for information exchange, and keep members informed through regular communications and information. This information, along with the new member sign-up form, is easily accessible online at Commercialbuildings.energy.gov/alliance.

Coordination with Other Efforts of Interest

In 2013, DOE’s Alliance will be benefitting from a closer connection to other efforts in the Better Buildings Initiative. The goal of the Better Buildings Initiative is to drive 20 percent or greater energy savings in the commercial and industrial sectors by 2020 through innovation, new technologies, and profiling leadership. The Alliance is a cornerstone of the efforts and as such will evolve to the “Better Buildings Alliance.” Better Buildings Alliance members who commit to increased transparency and a minimum of a 20 percent energy improvement goal by 2020 are also eligible for higher-level recognition through the Better Buildings Challenge. For more information, visit BetterBuildings.energy.gov.

Sector	Account Manager	Email	Phone #
Retail	Meg Giuliano	meg.giuliano@icfi.com	703.225.2874
Commercial Real Estate	Paul Coraggio	pcoraggio@jdmgmt.com	703.679.7329
Hospitality	Jen Singer	jen.singer@icfi.com	301.244.5894
Food Service and Grocery	Natalie Chadwick	natalie.chadwick@icfi.com	202.862.1261
Healthcare	Leigh-Golding DeSantis	leigh-golding.desantis@icfi.com	202.862.1202
Higher Education	Zach Abrams	zach.abrams@icfi.com	646.334.1174



CONCLUSION

2012 was a great year for the Alliance and for greater energy efficiency in the U.S. Together, we helped to speed energy innovation through product challenges, created quality online resources, and introduced five new specifications that, if widely implemented, could reduce energy use by over 66 TWh per year. These are just a few examples of the many activities in which Alliance members are currently involved—activities that are helping them to set and achieve more aggressive goals and realize even greater savings.

We look forward to working together with you as we continue to increase the impact of the Alliance and all of DOE's program offerings. Together, we can ensure that commercial real estate organizations are leaders in the effort to increase our nation's energy efficiency while making American business and the economy stronger and more competitive.